MINERALOGY AND GEOCHEMISTRY OF POST-IMPACT SEDIMENTARY INFILL OF THE CRATER MOAT AND CARBONATES OF THE CRATER FLOOR, WAQF AS SUWWAN IMPACT STRUCTURE. H. N. Khoury[1], E. M. Salameh[1], and W.U. Reimold[2], [1]Department of Geology, The University of Jordan, Amman 11942; e-mail: khouryhn@ju.edu.jo; salameli@ju.edu.jo, [2]Museum für Naturkunde – Leibniz Institute of Evolution and Biodiversity Research, Invalidenstrasse 43, 10115 Berlin, Germany; e-mail: uwe.reimold@mfn-berlin.de; also Humboldt-Universität zu Berlin, Unter den Linden 6, 10099 Berlin, Germany.

Introduction: The Waqf as Suwwan complex impact structure in eastern Jordan of about 6.5 km diameter was formed as a result of the impact of an extraterrestrial projectile, presumably in late Cretaceous to Eocene times [1, 2, 3, 4]. The structure offered a plethora of structural geological information, especially regarding the deformation of a central uplift. Three boreholes were drilled into the moat around the central uplift structure. The deepest borehole was drilled to the north and outside of the central uplift to a depth of 140 m. The first 11 m core reveals the presence of fluvial sediments (wadi deposits) that are dominated by chert breccias. The rest of the core is made up of upper Cretaceous limestone and dolomite. Brecciation and fracturing with vertical, as well as inclined (45^0 and 30^0) fractures occur throughout the cores. Forty samples were subjected to mineralogical, petrological, chemical and stable isotope analyses.

Results: The top 11m fluvial sediments of the core are parapolymictic breccias made up of crypto- to micro-crystalline and fibrous, angular, brecciated and cracked lithics. Chert is the major component, together with micritic and biomicritic limestone lithics. Quartz grains are angular to sub-angular, bimodal with a predominance of silt over sand size. Few quartz crystals exhibit wavy extinction, some with intense microfracturing. Secondary dolomite and sparry calcite are embedded in the micritic matrix. The only possible shock deformation is suggested by sporadic, intense fracturing in zircon and quartz. Neither PF, PDF, nor FF has been observed. The rest of the core is made up of fractured and brecciated limestone and dolomite. Calcite and dolomite crystals in the carbonates are locally characterized by intense twinning and other deformation. Stable isotope data ($\delta^{13}C$ and $\delta\ ^{18}O$) show no deviation from their upper Cretaceous and Eocene carbonate equivalents in Jordan (Fig. 1).

Conclusion: The results are combined to indicate that the drilled strata below the wadi deposits represent a level of unshocked or at best very weakly (< 5 GPa) shocked crater floor. This fact further suggests that the entire impact structure is very deeply eroded. The stratigraphic information from drilling indicates that the age of the impact is constrained to post-late Eocene age. Unfortunately, still no directly datable lithologies have been incurred to confirm this with absolute age data[4].

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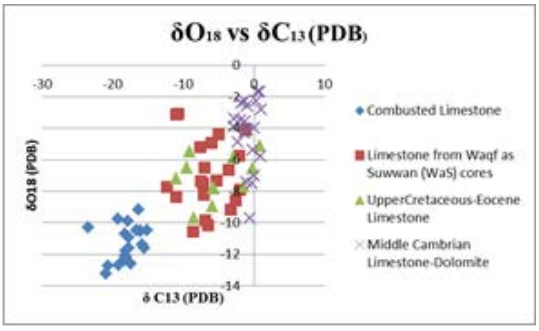

Fig. 1. Stable isotope data (δO18 and δC13) of lim - stone from Waqf as Suwwan (WaS) cores compared with equivalent upper Cretaceous-Eocene, combusted and Paleozoic carbonates.